

# United States Court of Appeals for the Federal Circuit

2006-1602

HONEYWELL INTERNATIONAL, INC. (formerly known as AlliedSignal, Inc.)  
and HONEYWELL INTELLECTUAL PROPERTIES, INC.  
(formerly known as AlliedSignal Technologies, Inc.),

Plaintiffs-Appellants,

v.

HAMILTON SUNDSTRAND CORPORATION  
(formerly known as Sundstrand Corp.),

Defendant-Appellee.

Robert G. Krupka, Kirkland & Ellis LLP, of Los Angeles, California, argued for plaintiffs-appellants. With him on the brief were Jonathan F. Putnam, Lee Ann Stevenson, and Kevin N. Malek, of New York, New York.

Mark L. Levine, Bartlit Beck Herman Palenchar & Scott LLP, of Chicago, Illinois, argued for defendant-appellee. With him on the brief were Chris J. Lind and Brian C. Swanson. Of counsel on the brief was David H. Herrington, Cleary Gottlieb Steen & Hamilton LLP, of New York, New York.

Appealed from: United States District Court for the District of Delaware

Judge Gregory M. Sleet

FILED  
CLERK, U.S. DISTRICT COURT  
DISTRICT OF DELAWARE  
2008 JUN 10 AM 8:12

# United States Court of Appeals for the Federal Circuit

2006-1602

HONEYWELL INTERNATIONAL, INC. (formerly known as AlliedSignal, Inc.)  
and HONEYWELL INTELLECTUAL PROPERTIES, INC.  
(formerly known as AlliedSignal Technologies, Inc.),

Plaintiffs-Appellants,

v.

HAMILTON SUNDSTRAND CORPORATION  
(formerly known as Sundstrand Corp.),

Defendant-Appellee.

Appeal from the United States District Court for the District of Delaware in case  
no. 99-CV-309, Judge Gregory M. Sleet.

---

DECIDED: April 18, 2008

---

Before NEWMAN, RADER, and DYK, Circuit Judges.

Opinion for the court filed by Circuit Judge RADER. Dissenting opinion filed by  
Circuit Judge NEWMAN.

RADER, Circuit Judge.

Honeywell International, Inc. and Honeywell Intellectual Properties, Inc.  
(collectively "Honeywell") brought suit against Hamilton Sundstrand Corporation  
("Sundstrand") for infringement of claims 8, 10, 11, 19, and 23 of United States  
Patent No. 4,380,893 ("the '893 patent") and claim 4 of Patent No. 4,428,194  
("the '194 patent"). Because "rewriting of dependent claims into independent  
form coupled with the cancellation of the original independent claims creates a  
presumption of prosecution history estoppel," this court vacated an earlier

infringement verdict in favor of Honeywell and remanded to determine whether Honeywell could rebut the presumption of surrender under Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722 (2002) (Festo VIII), remanded to 344 F.3d 1359 (Fed. Cir. 2003) (en banc) (Festo IX). Honeywell Int'l Inc. v. Hamilton Sundstrand Corp., 370 F.3d 1131, 1134 (Fed. Cir. 2004) (en banc) (Honeywell II). On remand, the United States District Court for the District of Delaware barred Honeywell from asserting the doctrine of equivalents. Honeywell Int'l Inc. v. Hamilton Sundstrand Corp., No. 99-309, 2006 U.S. Dist. LEXIS 57030, at \*2 (D. Del. Aug. 14, 2006) (Honeywell III). Because Honeywell did not show that the alleged equivalent was unforeseeable at the time of the narrowing amendment or that the narrowing amendment bore no more than a tangential relation to the alleged equivalent, this court affirms.

I

The patents at issue claim technology to control airflow surge in auxiliary power units or "APUs." An APU is a gas turbine engine often used in the tail end of aircraft. The APU generates electricity for the aircraft and includes a load compressor to supply compressed air for starting the aircraft's main engines and for controlling the cabin's environment during flight. Because APUs face rapidly changing demand levels for compressed air during flight, they must control against "surges." A surge is an aerodynamic phenomenon, which occurs when airflow through the compressor is too low. In a surge condition, the airflow cannot exit the compressor. Instead, the airflow surges back into the compressor, potentially damaging the APU.

A surge control system maintains a minimum level of airflow through the compressor at all times. Conventional systems provided a wide safety margin by drawing more air than required into the compressor's main air duct and venting the excess through a surge bleed valve. While effective, these prior art systems were inefficient. Honeywell's patents claim a more efficient APU surge control system. Honeywell's invention establishes a "set point" that represents the minimum flow to avoid surges. "Ambient air . . . is drawn through a set of adjustable inlet guide vanes ("IGV") . . . ." '893 Patent col.3 ll.64-65. The IGVs open and close like Venetian blinds and regulate the amount of ambient air drawn into the load compressor. The value of the set point is "a function of the position of said [IGVs]." Id. col.12 ll.11-12. The invention regulates this set point by comparison to a "flow-related parameter" that measures airflow out of the compressor. Id. col.2 ll. 48-54. "Thus a comparison is made between the actual flow conditions (represented by the flow-related parameter) and the desired flow conditions (represented by the set point)." Honeywell II, 370 F.3d at 1134. The invention generates an error signal if the airflow through the compressor is too low. In response to this signal, the inventive APU determines the proper setting of the surge bleed valve to prevent a build up of pressure and maintain sufficient airflow. '194 Patent col.2 ll.12-20, 55-60.

The '194 patent issued from a divisional of the application that issued as the '893 patent. During prosecution of the '893 patent, to overcome a rejection under 35 U.S.C. § 121, the applicant separated the system claims from the method claims. The system claims issued in the '893 patent, and the method

claims issued in the '194 patent. The independent claims on appeal are claims 8 and 19 of the '893 patent and claim 4 of the '194 patent. Each of these claims requires the APU to include IGVs, which are used by the surge control system. These independent claims were dependent claims 17, 35 and 51 in the original application that ultimately issued as the '863 patent. The original independent claims (application claims 16, 32 and 48) did not contain any reference to IGVs or any use of the position of these guide vanes in the surge control system. The United States Patent and Trademark Office rejected the original independent claims as obvious in light of the prior art, but allowed the dependent claims when rewritten into independent form. Claims 8 and 19 of the '893 patent state:

8. A gas turbine engine accessory power unit having a fluctuating compressed air supply demand, said accessory power unit comprising:
  - (a) a compressor having adjustable inlet guide vanes;
  - (b) duct means for receiving compressed air discharged from said compressor and supplying the received air to the pneumatically-powered apparatus;
  - (c) surge bleed means operable to exhaust from said duct means a selectively variable quantity of air to assure at least a predetermined minimum flow rate through said duct means and thereby prevent surge of said compressor;
  - (d) sensing means for sensing the value of a predetermined, flow-related parameter within said duct means and generating an output signal indicative of said value, said value of said flow-related parameter being substantially independent of the temperature of the compressed air;
  - (e) comparator means for receiving said sensing means output signal and generating an error signal representing the difference between the sensed value of said parameter and a desired value thereof, said comparator means having an adjustable control set point representing said desired value of said parameter;
  - (f) means for transmitting to said comparator means a reset signal for varying said set point as a function of the position of said inlet guide vanes in accordance with a predetermined reset schedule; and



- (g) control means for receiving said error signal and transmitting to said surge bleed means a control signal to operate said surge bleed means, the magnitude of said control signal having, relative to the magnitude of said error signal, a proportional component and an integral component, whereby said minimum flow rate through said duct means is essentially constant regardless of the compressed air supply demand of the pneumatically-powered apparatus.

'893 Patent col.11 l.52 - col.12 l.23 (emphases added).

19. A control system for assuring a substantially constant minimum flow rate through a duct receiving air discharged from a compressor or the like having adjustable inlet guide vanes, the duct having a supply outlet connected to pneumatically-operated apparatus having a variable supply air demand, the duct further having an exhaust outlet, said control system comprising:
- (a) a flow regulating device adapted to be positioned in the exhaust outlet and operable to selectively vary air flow outwardly therethrough;
  - (b) a sensing device having a sensing portion adapted to be positioned in the duct to sense therein a predetermined parameter related to the air flow rate through the duct, said sensing device further having an output portion;
  - (c) an adjustable set point comparator having an input portion coupled to said output portion of said sensing device, and an outlet adapted to generate an error signal;
  - (d) a proportional controller having an inlet coupled to said output of said comparator and further having an outlet;
  - (e) an integral controller having an inlet coupled to said outlet of said comparator and further having an outlet;
  - (f) a summer having a first inlet coupled to said outlet of said proportional controller, a second inlet coupled to said outlet of said integral controller, and an outlet coupled to said flow regulating device; and
  - (g) a guide vane position sensor and a function generator coupled in series between the inlet guide vanes and said input portion of said comparator.

Id. col. 4 l.62 - col.16 l.22 (emphases added).

Claim 4 of the '194 patent states:

4. A method of utilizing a compressor of a gas turbine engine to power pneumatically-operated apparatus having a variable inlet

air flow demand, the compressor having adjustable inlet guide vanes, said method comprising the steps of:

- (a) interconnecting a supply duct between the compressor and the pneumatically-operated apparatus;
- (b) flowing discharge air from the compressor through said supply duct to the pneumatically-operated apparatus;
- (c) maintaining an essentially constant minimum supply duct flow rate, despite fluctuations in the flow rate of air received by the pneumatically-operated apparatus, by exhausting air from said supply duct in response to variations therein of the value of a predetermined, flow-related parameter, the flow rate of air exhausted from said supply duct being related to the magnitude of said parameter value variations in both a proportional and time-integral manner, said maintaining step including the steps of providing an outlet passage from said supply duct, positioning in said outlet passage a surge bleed valve operable to selectively vary the flow of air outwardly through said outlet passage, generating an integral control signal in response to said variation in said flow-related parameter, generating a proportional control signal in response to said variations in said flow-related parameter, and simultaneously utilizing said integral and proportional control signals to operate said surge bleed valve; and
- (d) adjusting the relationship between the magnitudes of said integral and proportional control signals and the magnitudes of said parameter variations as a function of the position of the inlet guide vanes.

'194 Patent col.10 l.64 - col.12 l.16 (emphases added).

Sundstrand manufactures the APS 3200, an APU device with a surge control system that compares a flow-related parameter called DELPQP to a set point based on air inlet temperature and adjusts the surge bleed valve in response. DELPQP is an acronym for delta P over (quotient) P and measures pressure differentials as a proxy for airflow. At high flow levels, DELPQP can lead to an ambiguous signal, where DELPQP becomes inversely proportional to the amount of flow. The ambiguous signal may cause the system to open the surge bleed valve unnecessarily to increase flow. This incorrect reading issue is

known as the double solution or inverted-V problem. The APS 3200 solves this problem by blocking the control signal during high-flow conditions. The system uses in part IGV position to determine whether the APU is experiencing high flow or low flow, and consequently whether to block the control signal.

Honeywell filed suit on May 17, 1999 alleging that Sundstrand's APS 3200 infringed claims of three of its patents, including the '893 and '194 patents. Sundstrand filed a motion for partial summary judgment to limit damages to those incurred after February 3, 1999, the date it received actual notice of Honeywell's infringement allegations, because Honeywell did not mark its product under 35 U.S.C. § 287(a). Honeywell conceded that it did not mark its product with the '893 patent, but argued that the '194 method claim patent did not permit or require marking. The district court disagreed, granting partial summary judgment and holding that because both patents refer to the same tangible product, Honeywell could and should have marked the product. Honeywell Int'l Inc. v. Hamilton Sundstrand Corp., No 99-309, 2001 WL 66345, at \*3-4 (D. Del. Jan. 4, 2001). The district court also held that Honeywell could not recover damages for sales entered into before to February 3, 1999, even if delivery occurred thereafter. Honeywell Int'l Inc. v. Hamilton Sundstrand Corp., No. 99-309 (D. Del. Feb. 8, 2001).

On February 16, 2001, a jury found that Sundstrand infringed claims of the '893 and '194 patents under the doctrine of the equivalents. Honeywell Int'l Inc. v. Hamilton Sundstrand Corp., 166 F. Supp. 2d 1008, 1013-14 (D. Del. 2001) (Honeywell I). The jury further found that Honeywell was entitled to \$45,000,000



in price erosion damages and \$1,578,065 in reasonable royalty damages. Id. at 1014. The district court denied Sundstrand motions for judgment as a matter of law ("JMOL") and a new trial. Honeywell II, 370 F.3d at 1138. Both parties appealed. On February 5, 2004, this court, sua sponte, ordered that the case would be resolved en banc, without further arguments from the parties. Id. at 1139. The court held that Honeywell's act of "rewriting [the] dependent claims into independent form coupled with the cancellation of the original independent claims creates a presumption of prosecution history estoppel." Id. at 1134. Thus, the court vacated the judgment of infringement and remanded the case for the "determination of whether Honeywell [could] rebut the presumption . . . ." Id.

On remand, the district court held a two-day bench trial to determine whether prosecution history estoppel barred Honeywell from asserting the doctrine of the equivalents. Honeywell III, 2006 U.S. Dist. LEXIS 57030, at \*2. The parties contested the definition of the alleged equivalent element. In reaching its decision, the district court adopted Honeywell's articulation: "the Sundstrand APS 3200 surge control system with its unique DELPQP flow-related parameter and its particular use of the inlet guide vane position as part of the high-flow logic that that parameter occasioned." Id. at \*13-14. The district court correctly stated that Honeywell could rebut the presumption of surrender by demonstrating that (1) "the alleged equivalent would have been unforeseeable at the time of the narrowing amendment," or (2) "the rationale underlying the narrowing amendment bore no more than a tangential relation to the equivalent in question," or (3) "that there was 'some other reason' suggesting that the

patentee could not reasonably have been expected to have described the alleged equivalent." Id. at \*14 (quoting Festo IX, 344 F.3d at 1369).

Honeywell conceded the "some other reason" criterion. Honeywell Int'l Inc. v. Hamilton Sundstrand Corp., No 99-309, 2006 WL 2346446 (D. Del. Aug. 14, 2006). Thus, the district court focused on tangentiality and foreseeability. Because the parties agreed that the tangentiality inquiry should be decided solely on the prosecution history, the parties presented evidence at the bench-trial only on the issue of foreseeability. Honeywell argued that in the 1982-83 timeframe—which the parties agreed is the relevant period—the use of DELPQP and IGV position to detect surge was unforeseeable. Sundstrand argued that an APU developed in the late 1970's, the L1011, also measured a static pressure differential to avoid the double solution problem experienced by the APS 3200.

The L1011, however, distinguished between high flow and low flow through the use of a shock switch, rather than through IGV position. Supersonic speeds activated the shock switch, which caused the system to ignore the control signal and maintain the valves in their high flow position. These differences aside, the district court held that it was "quite intuitive" that it was foreseeable, in 1982-83, to one skilled in the art to measure the position of IGVs to distinguish between high flow and low flow. Id. at \*17. The district court recognized that both parties presented sufficient evidence to support their respective positions, but opined that the resolution was not a close call. Id. at \*17 n.2.

Turning to the tangential relation prong, the district court noted that the focus of this inquiry is on "the patentee's objectively apparent reason for the

narrowing amendment." Id. at \*19 (citing Festo IX, 344 F.3d at 1369). Honeywell argued that the reason for the underlying amendment was to overcome prior art that disclosed a surge control system with P and Delta P sensors and proportional and integral control, and that had nothing to do with IGVs. The district court disagreed with this characterization, as the DELPQP is a parameter that is also calculated by measuring P and Delta P. Thus, both the prior art and the equivalent in question involved the same flow-related measurement and the use of that measurement is directly related to the rationale underlying the amendments. Therefore, Honeywell did not rebut the presumption with the tangential relation prong. Id. at \*24-26.

Honeywell filed a timely appeal, asserting that it had rebutted the presumption of prosecution history estoppel under the foreseeability and tangential relation criteria. Honeywell also appeals the district court's pre-trial rulings limiting its damages claim under the method-only '194 patent and excluding from recovery reasonable royalties resulting from sales contracts entered before the notice letter date. Sundstrand argues that even if Honeywell is not estopped from alleging infringement under the doctrine of equivalents, the jury's verdict lacks sufficient support from trial evidence. This court has jurisdiction under 28 U.S.C. § 1295 (a) (1).

## II

"Prosecution history estoppel is a legal question subject to de novo review on appeal." Cybor Corp. v. FAS Techns. Inc., 138 F.3d 1448, 1460 (Fed. Cir. 1998) (en banc). This court, however, reviews any factual issues underlying the

inquiry for clear error. See Festo IX, 344 F.3d at 1369-70. This court reviews a district court's denial of a motion for JMOL de novo, applying the JMOL standard used by the district court. Interactive Pictures Corp. v. Infinite Pictures, Inc., 274 F.3d 1371, 1375 (Fed. Cir. 2001). JMOL is appropriate when "there is no legally sufficient evidentiary basis for a reasonable jury to find for that party on that issue." Fed. R. Civ. P. 50 (a)(1). This court also reviews a district court's grant of summary judgment without deference. Monsanto Co. v. Scruggs, 459 F.3d 1328, 1334 (Fed. Cir. 2006).

Under the doctrine of the equivalents, "a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is 'equivalence' between the elements of the accused product or process and the claimed elements of the patented invention." Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 21 (1997) (citing Graver Tank & Mfg. Co. v. Linde Air Prods. Co., 339 U.S. 605, 609 (1950)). The doctrine of prosecution history estoppel prevents a patent owner from recapturing with the doctrine of equivalents subject matter surrendered to acquire the patent. See Festo IX, 344 F.3d at 1365 (citing Festo VIII, 535 U.S. at 741).

Because the three asserted independent claims were rewritten from dependent form and because the original independent claims were cancelled, there is a presumption of prosecution history estoppel. See Honeywell II, 370 F.3d at 1134. Nonetheless Honeywell may rebut that presumption with a showing that: (1) "the alleged equivalent would have been unforeseeable at the time of the narrowing amendment" or (2) "the rationale underlying the narrowing

amendment bore no more than a tangential relation to the equivalent in question." Festo IX, 344 F.3d at 1369 (quoting Festo VIII, 535 U.S. at 741).

#### A. Foreseeability

On remand from the Supreme Court in Festo, this court explained that the foreseeability criterion

presents an objective inquiry, asking whether the alleged equivalent would have been unforeseeable to one of ordinary skill in the art at the time of the amendment. Usually, if the alleged equivalent represents later-developed technology (e.g., transistors in relation to vacuum tubes, or Velcro (R) in relation to fasteners) or technology that was not known in the relevant art, then it would not have been foreseeable. In contrast, old technology, while not always foreseeable, would more likely have been foreseeable. Indeed, if the alleged equivalent were known in the prior art in the field of the invention, it certainly should have been foreseeable at the time of the amendment. By its very nature, objective unforeseeability depends on underlying factual issues relating to, for example, the state of the art and the understanding of a hypothetical person of ordinary skill in the art at the time of the amendment. Therefore, in determining whether an alleged equivalent would have been unforeseeable, a district court may hear expert testimony and consider other extrinsic evidence relating to the relevant factual inquiries.

Id. at 1369 (citation omitted). Subsequently, we clarified that "[a]n equivalent is foreseeable if one skilled in the art would have known that the alternative existed in the field of art as defined by the original claim scope, even if the suitability of the alternative for the particular purposes defined by the amended claim scope were unknown." Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 493 F.3d 1368, 1382 (Fed. Cir. 2007) (Festo X).

The principle of foreseeability ties patent enforcement appropriately to patent acquisition. In making this connection, foreseeability reconciles the preeminent notice function of patent claims with the protective function of the



doctrine of equivalents. Thus, foreseeability in this context ensures that the doctrine does not capture subject matter that the patent drafter could have foreseen during prosecution and included in the claims. The goal of the principle is to ensure that the claims continue to define patent scope in all foreseeable circumstances, while protecting patent owners against insubstantial variations from a claimed element in unforeseeable circumstances. The foreseeability principle thus relegates the doctrine of equivalents to its appropriate exceptional place in patent enforcement.

To maintain consistency, a court must use the same definition of the equivalent to evaluate both foreseeability and infringement. As we explained in Festo X, adoption of different equivalents for infringement and foreseeability would produce perverse results. Id. at 1381. Under such a paradigm, patentees and accused infringers would reverse roles when arguing whether the equivalent met the test for infringement on the one hand, and foreseeability, on the other. Id. In this instance, the district court found that even the narrow equivalent proposed by Honeywell was foreseeable and thus precluded by estoppel principles. We agree.

To evaluate whether Honeywell can overcome the presumption of surrender, like the district court, this court assumes that Honeywell's proposed articulation of the equivalent element is correct: "the use of (1) a static pressure differential (i.e., DELPQP), which can be indicative of surge only if the APU is experiencing low flow, in combination with (2) IGV position, which is indicative of

whether the APU is experiencing low flow or high flow, to detect surge." Honeywell III, 2006 U.S. Dist. LEXIS 57030, at \*13-14.

This court must examine, on the basis of this record, whether the use of IGV position to detect high flow and low flow was later-developed technology and thus unforeseeable at the time of the amendments during the prosecution process. The timing of Sundstrand's product development does not settle the issue. The record shows that Sundstrand developed its equivalent between 1991 and 1995, after the relevant amendments in 1982-83. The mere temporal relationship of the equivalent to the patent acquisition and amendment process, however, does not make the equivalent unforeseeable. The record shows that Sundstrand began using IGV position to control airflow within two months of observing the double solution problem, which suggests that the IGV solution may have been known (and foreseeable) in the art. The record also shows that Sundstrand refined this way of addressing the problem over the next four years—evidence susceptible to characterization as either showing difficulty in reaching the ultimate solution or showing the natural and foreseeable application of well-known principles.

However, Honeywell contends that the district court's determination was clearly erroneous because in the 1982-83 time frame surge control systems did not use inlet guide vane position to ascertain the existence of high or low flow situations for surge control. Honeywell is correct that the systems in the 1982-83 time period did not use inlet guide vane position for this purpose, but it was known that the control of surge was important; that systems, such as the L1011

system, had been developed for that purpose; and that inlet guide vanes were routinely used in surge control systems and affected the air flow rate. For example, U.S. Patent No. 4,164,035 ("the Glennon patent"), issued in 1979, claims a surge control system and teaches that IGV position affects airflow rate. Honeywell's expert, Mr. Muller, also testified:

Q: In fact, going back to the 1970s, it was Honeywell's understanding that in order to efficiently control surge, you would need to take into account inlet guide vane angle and input into your surge control system. Correct?

A: Well, by using this information you can incrementally improve the operation of a surge controller, yes.

The record also shows no technical barrier to the use of IGV position to determine air flow, as Honeywell's corporate representative, James Clark, admitted. He confirmed that Honeywell "could have [] solved [the double solution problem] using inlet guide vane position" in the 1970s. Foreseeability does not require that the accused infringing product or process be foreseeable, nor that any equivalent exist at the time; rather foreseeability only requires that one of ordinary skill in the art would have reasonably foreseen the proposed equivalent at the pertinent time. Festo X, 493 F.3d at 1382. Sunstrand's expert, Dr. Japiksi, whom the district court found to be credible, concluded that it was "known or foreseeable to a person of ordinary skill in the art in 1982 to use IGV position to determine whether the flow was high or low." Based on this testimony and the record evidence described above, the district court concluded that "measuring IGV position . . . is a reasonably obvious way – both at present and in 1982-83 – to determine whether the APU is experiencing high flow or low flow." Honeywell

III, 2006 U.S. Dist LEXIS 57030, at \*17. This court finds no clear error in the district court's conclusion.

While both parties presented expert witnesses, the district court determined, after observing the witnesses' demeanor and credibility, that the resolution was not close. Id. at \*17 n.2. The Supreme Court has instructed: "[W]hen a trial judge's finding is based on his decision to credit the testimony of one of two or more witnesses, each of whom has told a coherent and facially plausible story that is not contradicted by extrinsic evidence, that finding, if not internally inconsistent, can virtually never be clear error." Anderson v. City of Bessemer City, 470 U.S. 564, 575 (1985); The Am. Original Corp. v. Jenkins Food Corp., 774 F.2d 459, 462 (Fed. Cir. 1985). As discussed above, while the timing of Sundstram's product development is ambiguous with respect to the foreseeability criterion, much of the extrinsic evidence—most notably several prior art references in the record—supports the district court's decision.

Thus, the record supports the district court's finding that a person of ordinary skill in the art would have known of the use of IGV position to distinguish between high and low flow in order to resolve the double solution problem during 1982-83. Honeywell could have foreseen and included the alleged equivalent in the claims when they were amended. As a result, Honeywell did not rebut the presumption of surrender with evidence of unforeseeability.

This court also discerns no fatal error in connection with Federal Rule of Civil Procedure 52. This court perceives that the trial court did not offend the requirement to "find the facts specially." Fed. R. Civ. P. 52; Consolidated

Aluminum Corp. v. Foseco Int'l Ltd., 910 F.2d 804, 814 (Fed. Cir. 1994) ("A remand . . . in a case thought to be completed, is a step not lightly taken . . . .") Indeed, this court need only remand when it has "no way . . . to affirm or reverse the district court's action under review." Id. Because, as noted above, the record supplies sufficient evidence to affirm the district court's action, this court does not venture to apply rule 52 strictly. See id. ("An appellate court need not close its eyes to the record where . . . there is a way clearly open to affirm the district court's action."); see also, Metabolite Labs., Inc. v. Lab. Corp. of Am. Holdings, 370 F.3d 1354, 1370 (Fed. Cir. 2004).

This court also perceives no fatal error in the trial court's refusal to estop Sundstrand from reversing its prior position that the APS 3200 surge control system and its particular use of IGV position was unique (and perhaps unforeseeable). "Judicial estoppel applies when a party takes a later position that is inconsistent with a former position in the same dispute, on which the party had been successful and had prevailed based on the former position." Bonzel v. Pfizer, Inc., 439 F.3d 1358, 1362 (Fed. Cir. 2006). In the first place, it is not apparent that Sundstrand prevailed on any issue because of its alleged inconsistent position. Sundstrand did avoid a finding of literal infringement of claim 4 of the '194 patent and avoided enhanced damages despite the jury's determination of willful infringement. These putative victories, however, are difficult to link to Sundstrand's characterization of its product as unique. Indeed, the district court found that substantial evidence would have permitted a reasonable jury to conclude that the APS 3200 did not literally infringe elements



4(c) and 4(d) of the '194 patent because the APS 3200 did not literally infringe the flow-related parameter and did not use the IGV position in the same manner as described in those sections. Honeywell I, 166 F. Supp. 2d at 1018-19. Moreover, the district court declined to enhance damages because "there was little direct evidence which evinced the sort of culpable mindset that would make enhanced damages appropriate." Id. at 1040. Because the record does not link Sundstrand's success on these issues to its argument that its surge control system was unique, judicial estoppel does not apply. If any party was estopped, it was Honeywell, which, as noted above, apparently established infringement using a broader definition of the equivalent than it now urges with respect to the foreseeability issue.

In sum, this court does not discern any error in the district court's judgment that Honeywell did not rebut the presumption of prosecution history estoppel with evidence of unforeseeability.

#### B. Tangential Relation

The tangential relation criterion for overcoming the Festo presumption is very narrow. Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc., 480 F.3d 1335, 1342 (Fed. Cir. 2007). As this court provided in its Festo IX opinion on remand from the Supreme Court, the tangential relation criterion focuses on the "patentee's objectively apparent reason for the narrowing amendment." 344 F.3d at 1369. To rebut the estoppel presumption with tangentiality, a patentee must "demonstrate that the rationale underlying the amendment bore no more than a tangential relation to the equivalent in question," or, in other words, that

"the narrowing amendment was peripheral, or not directly relevant, to the alleged equivalent." Id. (citation omitted). Additionally, the reason for the narrowing amendment "should be discernible from the prosecution history record . . . ." Id. If the prosecution history reveals no reason for the narrowing amendment, the presumption is not rebutted. See id. at 1371-72 (the patentee did not rebut because the prosecution history revealed no reason for the amendment). Silence does not overcome the presumption.

The record shows that the examiner simply instructed that the dependent claims would be allowed if rewritten into independent form. Those instructions, however, must be placed in their proper context. As this court explained in Festo IX, "whether an amendment was merely tangential to an alleged equivalent necessarily requires focus on the context in which the amendment was made . . . ." 344 F.3d at 1370. The original independent claims disclosed a surge control system with P and delta P sensors and proportional and integral controls. Those claims, however, were rejected as obvious in light of the prior art. The original dependent claims were then rewritten into independent form and incorporated the limitations of the rejected independent claims. Therefore, the key to this inquiry is the content of the original dependent claims.<sup>1</sup> Those claims

---

<sup>1</sup> Claims 17, 35, and 51 of the application that issued as the '893 provided:  
 17. The accessory power unit of Claim 16 wherein said compressor has adjustable inlet guide vanes, the value of said flow-related parameter is substantially independent of the temperature of the compressed air, said comparator means have an adjustable control set point representing said desired value of said parameter, and said accessory power unit further comprises means for transmitting to said comparator a reset signal for varying said set point as a function of the position of

included the IGV limitation, which "refers to both the claimed structure of the [IGVs] and their claimed function in the surge control system . . . ." Honeywell II, 370 F.3d at 1137 n.2. Accordingly, when Honeywell rewrote the application dependent claims into independent form, it "effectively add[ed] the [IGV] limitation to the claimed invention." Id. at 1144. Thus, the record shows that Honeywell made the amendment to add the IGV limitation. Because the alleged equivalent focuses on the IGV limitation, the amendment bore a direct, not merely tangential, relation to the equivalent. Tangentiality does not help Honeywell overcome the presumption of surrender.

Because the record does not rebut the prosecution history estoppel presumption, Honeywell's challenges to the district court's rulings with respect to whether damages should be limited and whether the evidence is sufficient to support the jury's infringement verdict are moot.

---

said inlet guide vanes in accordance with a predetermined reset schedule.

35. The control system of Claim 32 wherein the compressor has adjustable inlet guide vanes, and said control system further comprises a guide vane position sensor and a function generator coupled in series between the inlet guide vanes and said input portion of said comparator.

51. The method of Claim 49 wherein the compressor has adjustable inlet guide vanes, and said method further comprises the step of adjusting the relationship between the magnitudes of said integral and proportional control signals and the magnitudes of said parameter variations as a function of the position of the inlet guide vanes.

IV

For the reasons stated herein, the court holds that Honeywell has failed to rebut the presumption of surrender, and is therefore barred by prosecution history estoppel from asserting the doctrine of equivalents. This court affirms the judgment of the district court.

AFFIRMED

COSTS

Each party shall bear its own costs.

# United States Court of Appeals for the Federal Circuit

2006-1602

HONEYWELL INTERNATIONAL, INC. (formerly known as Allied Signal, Inc.)  
and HONEYWELL INTELLECTUAL PROPERTIES, INC.  
(formerly known as AlliedSignal Technologies, Inc.),

Plaintiffs-Appellants,

v.

HAMILTON SUNDSTRAND CORPORATION  
(formerly known as Sundstrand Corp.),

Defendant-Appellee.

Appeal from the United States District Court for the District of Delaware in case no. 99-CV-309, Judge Gregory M. Sleet.

NEWMAN, Circuit Judge dissenting.

The court today applies its new presumption of surrender to all equivalents of the claim elements and limitations that originated in dependent claims that were never amended and that were not the subject of prosecution history estoppel. The court held in its previous opinion, Honeywell Int'l, Inc. v. Hamilton Sundstrand Corp., 370 F.3d 1131 (Fed. Cir. 2004) that "the surrendered subject matter is defined by the cancellation of independent claims that do not include a particular limitation and the rewriting into independent form of dependent claims that do include that limitation." Id. at 1144. Thus, although the limitation at issue (the inlet guide vanes used to control surge) had not been the subject of amendment, argument, or any other form of restriction, the court held that all equivalent guide vanes were presumed surrendered, not simply equivalents presumptively



barred by prosecution history estoppel. Id. My colleagues held that since there was no narrowing amendment or limiting argument during prosecution of the Honeywell dependent claims, surrender of the entire universe of potential equivalents is presumed when the original independent claim is cancelled. I have previously pointed out the flaws in these generalizations, id. at 1146 (Newman, J., dissenting in part), for neither precedent nor logic requires the presumption of unlimited surrender when the prosecution history does not support unlimited surrender. See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S.722 (2002):

The complete bar [] is inconsistent with the purpose of applying the estoppel in the first place -- to hold the inventor to the representations made during the application process and to the inferences that may reasonably be drawn from the amendment. By amending the application, the inventor is deemed to concede that the patent does not extend as far as the original claim. It does not follow, however, that the amended claim becomes so perfect in its description that no one could devise an equivalent. After amendment, as before, language remains an imperfect fit for invention. The narrowing amendment may demonstrate what the claim is not; but it may still fail to capture precisely what the claim is.

Id. at 737-38.

This court, after creating its new presumption of surrender, did not apply it to the Honeywell-Sundstrand issues on appeal, instead remanding to the district court. Indeed, the district court remarked on the absence of guidance, stating that it was "entering uncharted waters" in which it must "knock the rust off the old sextant and hope for the best." Honeywell Int'l Inc. v. Hamilton Sundstrand Corp., No. 99-309, 2006 WL 2346446 , at \*6 n.3 (D. Del. Aug. 14, 2006). Now my colleagues, apparently unsatisfied with the district court's analysis, offer their own, presenting a new rationale whereby they find that Honeywell engineers were indeed capable of solving the Sundstrand "double solution" problem using inlet guide vanes, although Honeywell did not do so, and therefore that the

Sundstrand equivalent was "foreseeable" to Honeywell and should have been patented by Honeywell in 1983. On this theory, my colleagues hold that this equivalent (as the jury found) cannot be reached under the doctrine of equivalents. The flawed sweep of this new rule is illustrated as my colleagues apply the rebuttal criteria of "foreseeability" and "tangentialness" to a presumptive surrender with no outer limit, for there is no prosecution history that narrowed the claim element at issue.

My colleagues not only broaden the grounds of presumptive estoppel to estop all equivalents to any of the elements and limitations that were presented in the dependent claims, but they also restrict the grounds of rebuttal by holding that "foreseeability" is established by other than the "readily known equivalents" contemplated by the Court in Festo, 535 U.S. at 740. Applying this new rule with no limit to the technology to which "foreseeability" is applied, my colleagues find "foreseeable" the Sundstrand guide vane technology that was developed a decade later. My colleagues find that Honeywell engineers were smart enough to have invented<sup>1</sup> the Sundstrand technology a decade earlier, and thus that Honeywell should or could somehow have claimed it, although it was not described and enabled by Honeywell. On this reasoning, the court holds that Honeywell cannot rebut the presumption of surrender of all equivalents using inlet guide vanes. From this unsound analysis, I respectfully dissent.

Whether and when an inventor is entitled to reach beyond the literal scope of what is claimed in the patent has received continuing attention from courts and the technology community, for the issues of law are not easy, and the considerations of equity are in tension. The Court in Festo, and earlier in Warner-Jenkinson, Co. v. Hilton-Davis Chem.

---

<sup>1</sup> The Sundstrand technology is patented to Sundstrand.

Co., 520 U.S. 17 (1997), revised the legal and equitable balance, limiting the doctrine of equivalents while preserving its viability. This court's new presumption of surrender of all equivalents, when there is no prosecution history estoppel as to elements from dependent claims that are placed in independent form, places new constraints on the patentee's access to the doctrine of equivalents. This aspect of patent-based innovation requires a more balanced analysis, in the national interest in innovation. As the Court stated in Festo, "if the doctrine is to be discarded, it is Congress and not the Court that should do so." 535 U.S. at 733.

***Rebuttal of the presumption of surrender -- foreseeability***

Now, although I accept as the law of this case that a presumption of surrender arose with respect to the use of inlet guide vanes to control surge, my colleagues apply the Festo rebuttal criteria in significantly more restrictive ways than were established by the Supreme Court. The Court had explained that "[t]hough prosecution history estoppel can bar a patentee from challenging a wide range of alleged equivalents made or distributed by competitors, its reach requires an examination of the subject matter surrendered by the narrowing amendment." Id. at 737. However, my colleagues do not examine the surrendered subject matter, and indeed they can not, for there is no narrowing amendment to define surrendered subject matter. The dependent claims were not rejected on any ground; they were simply "objected to" because they were in dependent form. The use of the inlet guide vanes was never discussed in the prosecution, and the guide vane clause was not amended in any dependent or independent claim. There was no prosecution for this issue based on prior art.<sup>2</sup> Unlike the Court's Festo presumption of prosecution history

---

<sup>2</sup> Sundstrand stated to the district court that "during the prosecution of the Patents-in-2006-1602

estoppel, which is limited by narrowing amendment, the panel majority's presumption of surrender is without limit. Honeywell, 370 F.3d at 1144 ("Under such circumstances, the surrendered subject matter is defined by the cancellation of independent claims that do not include a particular limitation and the rewriting into independent form of dependent claims that do include that limitation. Equivalents are presumptively not available with respect to that added limitation.").

In the remand decision from which this appeal is taken, the district court had recognized that the element for which equivalency was charged -- the inlet guide vanes used to adjust a set point to avoid surge -- had not been narrowed and thus did not fit the Festo mold. Nonetheless, the district court ruled that the Sundstrand apparatus and method with respect to the inlet guide vanes were "foreseeable" and that the rationale underlying the amendment bore more than a "merely tangential" relation to the Sundstrand equivalent. However, the district court declined to give its reasoning, stating that the record was "too extensive and complex" for the court to identify the facts on which its conclusion rested, and that it would be "unduly burdensome" to explain which evidence it credited. Honeywell, 2006 WL 2346446 at \*6 n.2. The district court stated that "it seems quite intuitive to this lay court that measuring IGV position . . . is a reasonably obvious way -- both at present and in 1982-83 -- to determine whether the APU is experiencing high flow or low flow." Id. at \*6. The court also mentioned "credibility," although it did not identify who or what it did not believe. The court concluded that the Sundstrand use of inlet guide vanes to control surge was "foreseeable," although witnesses for both sides agreed that the use of inlet guide vanes for surge control was not known at the time of the Honeywell

---

Suit, the Examiner did not reference any Prior Art that disclosed inlet guide vanes or the use of their position as part of a surge control system." Appellee's Br. at 10.



invention.

Equivalency is determined as of the time of litigation, while foreseeability for equivalency purposes is determined at the time of the patent application. The Court in Festo explained that foreseeability means "readily known equivalents," 535 U.S. at 740, not unknown equivalents developed a decade later. Honeywell's use of inlet guide vanes was developed before 1982, and the Sundstrand inlet guide vanes were developed between 1990 and 1995. Sundstrand had argued at the jury trial that its guide vane system does not infringe, either literally or under the doctrine of equivalents, because it was designed to meet what Sundstrand calls the "double solution" problem, and that its system makes a different use of inlet guide vane position than does Honeywell. These differences were not disputed. My colleagues nonetheless find the Sundstrand device and method "foreseeable" based on a combination of prior art surge control devices, and hold that Honeywell could have described and claimed the Sundstrand technology a decade before it was developed by Sundstrand.

In deciding whether the presumption of surrender has been rebutted, the question is whether the technological equivalent is embraced by subject matter that was relinquished during prosecution of the patent. This requires analysis of the prosecution history leading to cancellation of the original independent claim and rewriting of the original dependent claim in independent form. Patent claims are customarily presented in independent and dependent form, a practice encouraged by the Patent and Trademark Office, for it simplifies examination. When an original independent claim is cancelled, it is obligatory that the next dependent claim be placed in independent form. Even on the majority's analysis of the rebuttal criteria of foreseeability and tangentialness, the proper approach is



to determine what prompted the cancellation of the independent claim, and whether the element at issue for equivalency was implicated in that cancellation.

On remand, the district court attempted to apply the instructions from the Supreme Court and this court as to rebuttal of the presumption of prosecution history estoppel. The Court has guided that the foreseeability analysis must be "directed to the particular equivalent in question," *Id.* at 740. The particular equivalent is the Sundstrand device and method using the inlet guide vane positions to solve the so-called "double solution" problem that attends Sundstrand's choice of the DELPQP flow-related parameter, by blocking the control signal during high-flow conditions. Honeywell states that this is an equivalent use of inlet guide vanes, in the context of Honeywell's use of inlet guide vane position to adjust the set point against which the flow-related parameter is measured across the spectrum of flow conditions. The panel majority finds the Sundstrand device and method foreseeable and thus not reachable under the doctrine of equivalents.

The panel majority cites two references that it designates as prior art that rendered the Sundstrand device foreseeable a decade before Sundstrand developed it. My colleagues focus first on a device called the L1011 developed in the late 1970s; this device made no use of inlet guide vanes, but instead used a totally different system that approached the problem of the ambiguity of a flow parameter at high flow conditions by use of a "shock switch." I suppose the purpose of this reference is to show that the problem was not new; however, recognition of the problem does not render foreseeable Sundstrand's equivalent that was developed more than a decade later using inlet guide vanes.

The panel majority also relies on the Glennon patent, and finds that in 1979 it was

known that adjusting guide vane position has an impact on airflow. However, the issue is not the use of louvered vanes to control airflow, a known concept; the issue is whether it was foreseeable, at the time of the Honeywell patent application, to use inlet guide vanes for surge control in an accessory power unit in the manner of the Sundstrand device, as part of the decision logic for high-flow conditions when the DELPQP parameter produces an ambiguous signal.

My colleagues suggest that testimony from Honeywell's witnesses Clark and Muller establish foreseeability of the Sundstrand equivalent, for they testified that Honeywell was working on the use of inlet guide vanes to improve the operation of a surge controller, and that if they knew about the Sundstrand problem they might have figured out how to solve it in the way that Sundstrand solved it a decade later. But these witnesses did not testify that Honeywell already had this knowledge, or that it was known to the prior art or otherwise was a known equivalent or "reasonably foreseeable." It was undisputed that the Sundstrand equivalent was developed a decade later in full view of the Honeywell patents.

My colleagues also state that the district court's findings are predicated on witness credibility, and thus are untouchable. The district court did not tell us what aspects strained its credulity, or indeed why the district court had sustained the jury verdict in 2001 if tainted by the incredibility of witnesses. Deference to a district court's findings on credibility is generally warranted, but when the issue is one of objective science/technology, more is required than a terse announcement by the court that no reasons will be given for its ruling. As explained in Anderson v. Bessemer City, 470 U.S. 564 (1985), deference is warranted only when competing witnesses have "told a coherent and facially plausible story that is not contradicted by extrinsic evidence," and when the finding is "not internally inconsistent." Id.

No deference is owed to a district court's conclusion predicated upon findings it did not state or explain. See Edwards v. Wyatt, 335 F.3d 261, 274-75 (3d Cir. 2003).

The district court's reluctance to state the facts on which its conclusion rests, as Federal Rule of Civil Procedure 52 requires, negates the traditional deference. I accept that the record in this lengthy litigation is difficult to summarize, but I also accept -- for it is uncontradicted -- that the record is devoid of any evidence that the Sundstrand equivalent previously existed or was the "readily known equivalent" required by Festo. It was uncontradicted that the Sundstrand equivalent was developed years after the Honeywell application was filed and prosecuted, and only after considerable effort. Nothing in the record supports my colleagues' finding that the Sundstrand equivalent was foreseeable at the time the Honeywell patent applications were prosecuted.

Simply presenting claims of varying scope, whether in independent or dependent form, is not a narrowing amendment or argument. The patent examining rules encourage, through lowered fees, the use of dependent claims, for it facilitates examination. It is routine for broader claims to be cancelled and dependent claims to be rewritten in independent form. This protocol has no relevance to whether a claimed element is amended or narrowed or argued during prosecution. It is the narrowing of scope during prosecution that produces the presumptive estoppel; claim elements and limitations that were not the subject of amendment or argument do not raise the Festo presumption, and should not be deemed to raise this court's new presumption. Cancelling an independent claim is not an estoppel-generating act as to elements whose scope was not amended or otherwise restricted during prosecution.

Equivalency is determined element by element, Warner-Jenkinson, 520 U.S. at 29,

yet on the panel majority's presumption of surrender, there is no restricting action by which to measure what was surrendered. In Festo the Court was explicit that the burden is to "show[] that the amendment does not surrender the particular equivalent in question." 535 U.S. at 740. My colleagues err in now holding that all equivalents of an element presented by dependent claim are presumed surrendered by simply cancelling the independent claim.

### ***Tangential Relation***

The Court explained that when the asserted equivalent related to "aspects of the invention that have only a peripheral relation to the reason the amendment was submitted," the presumption of estoppel would be rebutted. Id. at 738. Precedent illustrates that the "tangential" criterion is rebutted when "[t]here is no indication in the prosecution history of any relationship between the narrowing amendment and [the process] which is the alleged equivalent in this case." Insituform Tech., Inc. v. Cat Contracting, Inc., 385 F.3d 1360, 1370 (Fed. Cir. 2004). That analysis well fits this case, for there is no indication in the prosecution history of any relationship between Honeywell's cancellation of the independent claim and the alleged equivalent Sundstrand apparatus or method.

The panel majority states that "when Honeywell rewrote the application dependent claims into independent form, it 'effectively add[ed] the [IGV] limitation to the claimed invention,'" maj. op. at 18 [alteration in original], and therefore, it provided "a direct, not merely tangential, relation to the equivalent," id. at 19. This is not the tangential relationship contemplated by Festo, where the Court demanded review of the reason for the narrowing amendment and the relation of that reason to the accused equivalent. It does not suffice to say that by narrowing a claim by adding an element, *ipso facto* the relation to the accused equivalent element is not tangential. This criterion relates to why

an amendment was made; it does not become irrebuttable simply when the accused equivalent concerns the same element that was added by amendment.

Exploration of this criterion requires, at a minimum, review of the reason for cancellation of the independent claim and rewriting the dependent claim in independent form. The panel majority makes no mention of the prosecution of the original independent claims, except to state that the examiner rejected them on the ground of obviousness. Although the panel majority states that “the key to this inquiry is the content of the original dependent claims,” this obscure statement leads to no analysis. In a situation where an originally dependent claim is asserted against an infringer under the doctrine of equivalents, and the asserted limitation was first introduced in a dependent claim, then according to the panel majority there is always more than a tangential relationship between the reason for the amendment and the accused equivalent, even when there is no finding as to the reason for the amendment. This renders the presumption of estoppel irrebuttable, whatever the reason for the amendment. However, the question is whether the subject matter of the accused equivalent was relinquished by the patentee during prosecution. This question should be resolved on its facts, not converted into a complete bar.

***Why does it matter?***

These nine years of proceedings do not reflect an optimum mode of patent dispute resolution. The jury verdict of infringement under the doctrine of equivalents was rendered in February 2001, and all outstanding issues were resolved by the district court by opinion rendered in 2001. The jury was instructed in accordance with precedent:

Instruction No. 3.5.3 . . . . The test for determining equivalency is whether, at the time of the asserted infringement, one of ordinary skill in the



art would consider the differences between the accused product or method and the element or elements of the patent claim not literally present to be insubstantial. If such a person would consider those differences not to be substantial, then infringement exists under the doctrine of equivalents.

Honeywell must prove infringement under the doctrine of equivalents by a preponderance of the evidence. In determining whether Honeywell has proven that a feature of the Hamilton Sundstrand product is equivalent to an element of a patent claim, you should focus on the individual element and maintain a special vigilance against allowing the concept of equivalence to eliminate that element entirely.

\*\*\*

It is not a requirement under the doctrine of equivalents infringement that those of ordinary skill in the art knew of the equivalent when the patent application was filed or when the patent issued. The question of whether Hamilton Sundstrand's product is equivalent to that defined in Honeywell's claims is to be determined as of the time of the alleged infringement.

The correctness of the instruction was not in dispute. The verdict of no literal infringement, but of infringement under the doctrine of equivalents, was sustained by the district court.

Honeywell Int'l, Inc. v. Hamilton-Sundstrand Corp., 166 F. Supp.2d 1008 (D. Del. 2001).

The court's holding today takes another step to remove patent issues from the jury, but adds nothing to consistency or stability or predictability of the law. I respectfully dissent.

CERTIFIED COPY  
I HEREBY CERTIFY THIS DOCUMENT  
IS A TRUE AND CORRECT COPY  
OF THE ORIGINAL ON FILE.  
UNITED STATES COURT OF APPEALS  
FOR THE FEDERAL CIRCUIT  
By: Christine Date: 6/5/08